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## ROYAL GARDENS, KEW.

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### BULLETIN

OF

## MISCELLANEOUS INFORMATION.

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### CLV.—NATAL ALOES.

Flückiger and Hanbury make the following statement about this drug in the *Pharmacographia*, p. 686.

“Aloes is also imported from Natal, and since 1870 in considerable quantity. Most of it is of an hepatic kind and completely unlike the ordinary Cape aloes, inasmuch as it is of a greyish brown and very opaque. Moreover, it contains a crystalline principle which has been found in no other sort of aloes.

“The drug is manufactured in the upper districts of Natal, between Pietermaritzburg and the Quathlamba Mountains, especially in the Umvoti and Mooi River counties, at an elevation of 2,000 to 4,000 feet above the sea. The plant used is a large Aloe which has not yet been botanically identified. The people who make the drug are British and Dutch settlers employing Kafir labourers.”

The problem was treated in a paper by Messrs. J. Bainbridge and C. Morrow in the *Pharmaceutical Journal* for January 18, 1889, pp. 570, 571. The principal results are given in the following extract:—

“Natal aloes is usually supposed to be derived from the same plant as the Cape drug, but as its reactions are so very different, and its appearance

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does not in the least degree denote any similarity, we consider it at least probable that they are the produce of different plants.

"In fact, according to the reactions we have obtained, and which are described later on in this paper, Natal aloes would seem to be derived from *Aloe succotrina* rather than the species to which it has hitherto been attributed.

"There is one point to which we wish particularly to call attention. When nitric acid is added to Cape aloes on a white plate a reddish colour is produced, but this is not a colour by which Cape aloes could be identified. If the two be allowed to remain in contact for some time, five minutes, for instance, a green colour is produced which is permanent for some hours. This is a reaction which we found constant with all specimens of Cape aloes, whether museum specimens, or those bought in the ordinary course of trade.

"This result has not, to our knowledge, been noted before, and as it is not obtained from any other commercial variety, we think it is a fairly good test for Cape aloes. Seeing that this reaction is constant with all the specimens of Cape aloes examined, we thought an effort ought to be made to ascertain the species yielding this variety of aloes. It has been stated to be obtained from various species, viz., *Aloe spicata*, *A. platylepis*, *A. plicatilis*, *A. ferox*, *A. arborescens*, *A. perfoliata*, *A. linguaformis*, *A. purpurascens*, &c., or it has been thought to be the product of the mixed juices of several species or of the hybrids obtained by crossing them.

"It was suggested by Mr. E. M. Holmes, F.L.S., that it might be possible to determine this point by testing the aloes obtained from leaves of authentic specimens of the various species of aloe as grown at the Royal Gardens, Kew.

"By the kindness of Mr. W. T. Thiselton Dyer, F.R.S., Director of Kew Gardens, to whom Mr. Holmes applied on our behalf, we were enabled to follow up this idea. The leaves of a number of different species of aloe were obtained. The juice from them was evaporated over a water-bath, and the residue tested as ordinary aloes. On evaporation, the juices of *Aloe ferox*, *A. purpurascens*, and *A. succotrina* were of a distinct purple colour. The results of our experiments on these aloes were hardly what we expected.

"The only variety of the Kew aloes which gave the reactions of Cape aloes was *Aloe africana*, and in this case the reaction with nitric acid was the same, viz., a green colour resulting on standing for a few minutes. The colours with Cripps and Dymond's tests were also identical. We think it is at least likely that *some* of the Cape aloes of commerce is yielded by *A. africana*, especially as the leaf is very large and succulent, and we are informed that it is plentiful [in the Eastern Provinces] at the Cape.

"We were unfortunately unable to obtain a genuine specimen of *Aloe spicata*, so that we are unable to say anything about that species.

"With regard to Cape aloes being derived from *A. plicatilis*, we think this is rather improbable, as it is, according to Mr. Watson (Assistant Curator of Kew Gardens), a comparatively rare species at the Cape, and the leaves are much smaller, and not so succulent as in the other species.

"With several of the specimens of aloes obtained by us from plants grown at Kew, a reaction was obtained which we did not find with any commercial specimen, viz., 1 drop of bromine water, added to a little of the powder, developed a colour varying from pale to dark purplish-red or damson-colour.

"We do not consider this reaction as a proof that the commercial aloes are not derived from these species, but think it possible that the



property may be lost on keeping or by fermentation. The species which gave this reaction were *Aloe ferox*, *A. purpurascens*, and *A. succotrina*. Of these we wish to particularly notice *A. succotrina*. The inspissated juice of this plant gives reactions which are exceedingly like those of commercial Natal, viz.:—

- “(1) A crimson colour with nitric acid which remained for a considerable time.
- “(2) A deep blue colour when mixed with sulphuric acid and vapour of nitric acid blown over it.
- “(3) A deep purplish-red or damson colour with bromine water.

“Comparing these results with those obtained from commercial Natal aloes, we find that they agree perfectly except in the matter of the bromine reaction.

“This plant, we are informed by Mr. Watson, was formerly thought to grow in Socotra, and [supposed] to yield Succotrine aloes, but he says it is undoubtedly a South African species, and is not the source of the Succotrine aloes of commerce.

“Thus it is probable that this plant yields Natal aloes. *Aloe plicatilis* gave no definite reactions, although it is mentioned as a source of Cape aloes in the *Pharmacographia* (edit. 2, p. 679), nor did we obtain any better results with *Aloe chinensis*, or with *A. arborescens*, var. *frutescens*.

“We conclude, therefore, from our experiments:—

- “1. That Cape aloes may be produced from *A. africana*, but chemical tests afford no evidence that it is obtained from the other species which have been stated to yield it.
- “2. That Natal aloes may be obtained from *A. succotrina*, but that chemical tests do not indicate that the other species whose inspissated juice we examined are likely to produce it.
- “3. That the aloes at present sold in commerce as Socotrine aloes is not obtained from *Aloe Perryi*, but probably from some variety of *Aloe vulgaris* or species allied to it; and
- “4. That the hepatic aloes of commerce is probably obtained from *Aloe Perryi*.

“We take this opportunity of expressing our obligations to Mr. W. T. Thiselton Dyer for the facilities he so liberally afforded us in our investigations, to Mr. Watson for the information he so kindly gave us concerning the Cape species, which he has seen growing in their native country, and to Mr. E. M. Holmes for the many suggestions he has so freely given us in the course of our experiments.”

It seemed worth while making an attempt to ascertain the identity of the plant actually used in Natal. An inquiry was therefore addressed to Mr. J. Medley Wood, A.L.S., the Curator of Natal Botanic Gardens. He very obligingly promised to look into the matter.

CURATOR, BOTANIC GARDENS, DURBAN, to ROYAL GARDENS, KEW.

Botanic Gardens, Durban, Natal,

MY DEAR SIR,

March 5, 1890.

I HAVE received yours of January 27th, and in consequence have decided to make my annual trip this year through the district where the Aloes is manufactured, that is, if I can procure a waggon, about which there is some doubt, in consequence of the great press of work, to Transvaal. If not I will take a trip by post cart to the district when



the aloe plants are in flower, and I have written to a person who is in the business for information on the subject. I have always understood that Natal Aloes was made from *A. ferox*, but persons to whom I have shown that plant appear to be somewhat undecided about it, but all agree that there is but one species from which the drug is made, though other and smaller growing species are to be found in the district.

Yours, &c.

(Signed) J. MEDLEY WOOD.

W. T. Thiselton Dyer, Esq., F.R.S., C.M.G.,  
Royal Gardens, Kew.

The result of his investigations is contained in the following interesting report, dated May 13, 1890. From this it appears that the manufacture of the drug is quite discontinued. Mr. Wood is of opinion that its source was *Aloe ferox*, which according to Flückiger and Hanbury is one of the plants "reputed to yield the best Cape Aloes."

The facts bearing on the question are so far somewhat conflicting. The present information is put together in the hope that it may lead to a critical re-examination of the whole subject in South Africa.

#### *Some Notes on Natal Aloes.*

As the Director of Kew Gardens, and also Mr. Holmes, of the Pharmaceutical Society's Museum, had expressed a wish for information, as to the plant from which Natal Aloes had been made, and for any information I could obtain on the subject, I decided to relinquish the idea of proceeding to Drakensburg for my annual botanising trip, and to visit the neighbourhood of Greytown instead. From this place some years ago the drug was exported in quantity, but at the present time its manufacture appears to be quite discontinued, and not a single person was engaged in it through the whole district, so far as I could learn. I was also informed before leaving Durban that the Aloe plants would be in flower about the middle of April, later than which I could not defer my journey; this information, however, proved incorrect, as I could not find a single plant either in flower or bud, though I searched carefully, and residents in the neighbourhood informed me that the flowers would not appear before July. Mr. Newmarch, jun., who has been engaged in the manufacture of the drug, very kindly accompanied me to the "Thorns," and pointed out places where the manufacture had been carried on. The whole country, both on the level ground and far up the hill sides, being thickly covered with the plants, so thickly that making our way between them on horseback was often a matter of difficulty. The average height of the mature stems was 8 to 10 feet, but Mr. Newmarch informed me that they are frequently met with from 15 to 20 feet high. As to the species, it is undoubtedly the one which has always been known to me as *A. ferox*, with perhaps a few of the variety *subferox*, and in the district which I visited it is quite certain that no other species has been used in the manufacture. Mr. Newmarch, jun., however, informed me that across the Mooi River, and in the direction of Weenen, another species is found in moderate quantity, and its leaves have been used, but whether alone or mixed with those of *A. ferox* I am unable to say; we were not, however, able to find even a single specimen of this plant, and the time at my disposal would not allow of my visiting the Weenen country on this occasion. The plant was described to me as being equal to *A. ferox* in size, the leaves light green or glaucous, prickly on the edge, but without any prickles on either surface, and the flowers red. I regret very much not having been able to



meet with it. I forward by the kindness of Mr. Newmarch, senr., a small specimen of the drug, made about two years ago, from the plants which I saw, and which is certainly unmixed with the juice of any other species than the one known to me as *A. ferox*, the sample being taken from a full box opened by Mr. Newmarch for the purpose. Mr. Newmarch pointed out to me in his garden another species which he believed had been sometimes used, and which was said to yield a lighter coloured juice, but other persons said that they had never seen or heard of its being used, nor is it at all plentiful in the district where the drug is made, seeming to prefer the tops of the hills, while *A. ferox* is more plentiful in the valleys and along the hill sides. I send a photograph of a plant of this species taken in the Botanic Gardens, and plants or cuttings can be sent at any time if desired. I think, however, that its leaves have not been used, except perhaps accidentally. The process of manufacture as described to me by Mr. Newmarch, senr., is as follows:—Each workman is provided with a stout leather glove for the left hand, a cutlass or bill-hook, and a trough similar to a pig-trough, made of 6-inch board, with square ends so as to stand level, and having on each side a rail at a sufficient height from the top of the trough to support the ends of the leaves. As the leaves are cut the workman places them on each side of the trough, with the cut end downwards, and lays one row over the other until the trough is full. He then fills in the same manner a second and a third trough, by which time the leaves in the first are sufficiently drained of their juice, and are taken off and thrown away, the juice in the trough being then emptied into a bucket. A good hand will collect about a bucketful of juice each day. I was also informed that those plants which were most covered with prickles were considered to be the best, as they were thought to yield more juice than the others. When sufficient juice is collected it is placed in an iron pot or boiler. Mr. Newmarch used an iron boiler, holding about 100 gallons, which rested upon brickwork, and was provided with a chain and lever, by means of which it could be quickly lifted from the fire and swung aside when the juice was sufficiently cooked. As soon as the fire is lighted the attendant commences to stir the juice, which at first adheres both to the stirring stick and to the sides of the pot, but after half an hour to an hour's boiling the juice becomes thicker, until when it leaves the sides of the pot quite clean it is considered to be sufficiently cooked, and is quickly lifted from the fire, and at once poured into the box, where it is left to cool before being finally screwed down for export. Mr. Newmarch also informed me that much carelessness has been shown in the manufacture; some in consequence of not having sufficient hands employed, leaving the juice too long in the iron pots before boiling; some have boiled too much, and others too little, and he has seen boxes being carted away with the juice dripping through the joints of the boxes. He also informed me that the manufacture has been carried on at all seasons of the year, the yield of juice being greater during the summer months, but requiring more boiling. If it would be any advantage to you to have plants of the species alluded to here as *A. ferox*, from which the sample of the drug sent has been made, and which is undoubtedly identical with the plant growing in the Botanic Gardens here, and represented in *Gardeners' Chronicle*, vol. v., p. 113, fig. 14, I shall have much pleasure in obtaining for you, either small plants or a moderately sized trunk, whichever you may prefer, and I shall also try to obtain specimens of flowers for the Herbarium.

In conclusion I may say that I noticed at least two species of dwarf Aloe, intermixed with the large plants of *A. ferox*. One of



these is common all over the colony, the other I had not previously noticed, and I was unable to identify either. All accounts, however, agree that the leaves of these species are never taken, nor would it pay to do so, as they would require some searching for, while *A. ferox* abounds in every direction. Their leaves also are few, and comparatively small, and would not be worth the trouble of collecting.

(Signed) J. MEDLEY WOOD,

Durban, May 13, 1890.

## CLVI.—GAMBIA MAHOGANY.

(*Khaya senegalensis*, A. Juss.)

A timber under the name of West African mahogany has lately come into the English market, and inquiry has been made at Kew respecting the tree yielding it. In the first instance application was made to His Honour Gilbert T. Carter, C.M.G., Administrator of the Gambia, who very obligingly forwarded specimens of leaves, fruit, and timber, of what is known as Gambia mahogany. These specimens were determined by Professor Oliver, F.R.S., as yielded by *Khaya senegalensis*, A. Juss. (*Flora of Tropical Africa*, vol. i., p. 338.)

This is a large forest tree with 4 to 10 foliolate leaves and coriaceous, sub-opposite or alternate leaflets. The panicles are shorter than or nearly equalling the leaves with ascending or spreading lateral branches decreasing in length from below. The fruit somewhat resembles that of the true mahogany, and consists of a woody pericarp, separating from above in four valves, enclosing numerous flat-winged seeds arranged in two rows.

A good figure is given by Guillemin and Perrottet in *Fl. Senegamb.* (1830-33), t. 32. These authors furnish the following additional particulars:—

"This tree is one of the largest and most beautiful among those which adorn the banks of the Gambia and the low grounds of the peninsula of Cape Verde. It is found principally in the district of Bargny, and it is so abundant that it forms the chief feature in the forests of the country. It does not exist in Senegal properly so-called. We would, on this account, have willingly proposed a new specific name in place of *senegalensis*, given it in *l'Encyclopédie méthodique* [of Lamarck], if we had not seen a serious inconvenience in changing the name of a plant, described so fully and clearly in the work we have just cited. Since the year 1820, the French have introduced it into their plantations on the banks of the River Senegal, principally at Richard-Tol and at Sénaglaise, where it has flourished in avenues and in borders of gardens.

"Its trunk, which attains a metre and more [three to four feet] in diameter, is very straight, capable of being cut into fine planks with no appearance of knots or shakes, thus affording a very valuable wood for joinery and cabinet-making. It is almost as red as the true mahogany furnished by *Swietenia Mahagoni*, a tree which comes nearest to our species. It is, however, rather softer, with a less compact grain, and it has the inconvenience of splitting rather freely in drying. When the supply of gum [gum arabic] is not equal to the demand French vessels have come up the Gambia to seek cargoes of gum from this tree, which is imported to Europe. The extent of trade in this gum has not been considerable of late owing to the abundant supplies from other sources.



"The natives make furniture [from the timber], and especially shore-boats of great solidity. The bark is greyish brown, deeply cracked, of great bitterness, and it is said to possess febrifugal properties. It is employed in this connexion by the negroes, who take it in the form of an infusion and decoction. The tree is known to the negroes [of Senegambia] as *Cail*, and to the French residents as *Cail-Cedra*."

The exact distribution of *Khaya senegalensis* is evidently not well known. According to the *Flora of Tropical Africa* it is abundant near Cape Verde and on the Gambia, but it is not recorded as existing elsewhere on the West Coast. A form "with sparse inflorescence, drying pale green," was found by Speke and Grant on the banks of the White Nile, and it is supposed to have been met with by Dr. Meller in the Mozambique district. Professor Oliver, however, states that "until fruiting or flowering specimens shall have been matched doubt must attach to the above stations in Eastern Africa." Quite recently a sample of gum collected at Fanimah, Sierra Leone, by Mr. Alldridge, Travelling Commissioner, has been identified at Kew as yielded by this tree. Mr. Alldridge, in a letter dated Sulymah, 2nd May 1890, addressed to the Governor, writes: "I have the honour to forward a small tin containing a sample of gum which has been brought in from Fanimah. It is stated to be plentiful. I noticed the exudence from the trees when I was passing through Fanimah some time ago, when I was only able to get a very small sample. I have now, fortunately, succeeded in obtaining the present sample, which I trust will be sufficient for experimental purposes and to report upon."\* Although the gum proved of no value the observation respecting the trees yielding it has shown that *Khaya senegalensis* extends much further (about 500 miles) down the coast than was at first supposed, and it is probable that it may be found still further down. The West African mahogany now in the English market comes from Assinee, a river on the western boundary of Gold Coast Colony and Ashanti. No specimens, as yet, of the leaves and fruit have been received from this locality, but Messrs. Godfrey S. Saunders & Co. have been good enough to furnish the following information respecting the timber.

[No. 1.]

MESSRS. GODFREY S. SAUNDERS & Co. to ROYAL GARDENS, KEW.

5, New London Street, London, E.C.,

18th March 1890.

DEAR SIR,

MANY thanks for your note and the sample of Gambia mahogany, which has just come in.

There have been several imports of mahogany from Assinee (lower down on the West Coast of Africa), but they strike me as being of a different wood, being softer, lighter, and although good useful wood, are not, I fancy, so good as your specimen, though yours seems a trifle too heavy.

This Assinee wood comes forward in well squared logs, generally cut about 14 feet long, and a lot of 27 logs, weighing 43 tons, last in, varies from 24 to 40 inches in diameter at the larger end.

I think it would be quite worth while, for your friends to ship as a sample 25 logs, hewn as square as possible, 14 feet and upwards in

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\* The gum was of a dark colour and of little strength. Messrs. Brooks and Green, of Mincing Lane, report that "a consignment would not be likely to realize sufficient to cover freight and charges."

length, a fair average of what could be got; of course large, sound, straight logs are preferred, free from worm and rot. I think there is room for quite a good trade in it.

Yours, &c.  
(Signed) GODFREY S. SAUNDERS.

[No. 2.]

MESSRS. GODFREY S. SAUNDERS & Co. to ROYAL GARDENS, KEW.

5, New London Street, London, E.C.,

DEAR SIR,

8th April 1890.

THANKS for your letter of 24th March, which should have been answered earlier, but I have been abroad.

Unfortunately I cannot find my notes as to Crab wood (*Carapa guyanensis*) to which you refer, but my impression is that I thought it a redder wood than this Gambia mahogany. Is it not also lighter in weight? I do not think it has yet come into working here, but I will ask some friends to get me a sample.

As to Gambia mahogany I think there is no doubt at all that it should succeed well here. Other kinds are high in price, and cargoes are bringing from  $4\frac{1}{2}d.$  to  $6\frac{1}{2}d.$  per foot super. of 1 inch thick. There would be perhaps 323–350 feet to the ton of this wood.

The Assinee wood is selling well, but it is very well gotten out, or squared. I see no reason at all why the other should not do equally well.

Yours, &c.  
(Signed) GODFREY S. SAUNDERS.

## CLVII.—CEYLON CACAO.

(*Theobroma Cacao*, L.)

The Cacao industry, until of late years, has been chiefly confined to the tropical parts of America. Mexico, Guatemala, Venezuela, the United States of Colombia, Brazil, and the Guianas, being the chief producers of Cacao on the mainland, while Trinidad and Grenada have taken the lead amongst the islands of the West Indian Archipelago. The species of *Theobroma* yielding commercial Cacao are natives of Central and South America, and it is but natural to find that the largest areas under cultivation are situated near those regions. Plants of Cacao were introduced at an early period to the East Indies, and they are now found under cultivation in most tropical countries. Until quite recently, however, the best qualities (as also the largest quantities) of commercial Cacao were obtained from tropical America. The celebrated Cacao of Venezuela, known as Caracas Cacao, the choice Cacao of Soconusco, in Mexico, and the selected sorts of Trinidad Cacao were believed to be unapproachable for quality and flavour. It appears now, however, that even the best produce of tropical America does not reach the high standard which has been attained by Ceylon Cacao. In a recent letter received from Mr. J. H. Hart, F.L.S., Superintendent of the Botanical Gardens, Trinidad, he states: "For several mails I have noted in the "*Public Ledger* the increasing prices obtained for Ceylon Cacao in comparison with that obtained for the best Trinidad Cacao. In the "*Account Sales* dated the 29th March it is shown that Ceylon Cacao is



“ actually worth more by 24s. 6d. per cwt. than the best Trinidad “ marks. The difference between the inferior marks is greater still.” In view of these facts the planters in Trinidad and elsewhere are keenly discussing the merits of Ceylon Cacao, and seeking for the causes which have led to the production of an article so superior to anything produced before. It is true that the quantity of Cacao produced in Ceylon is relatively very small. In 1889 Ceylon produced only 17,164 cwts., while the production of Trinidad alone was probably not far short of 125,000 cwts.\* The general opinion appears to be that the superior quality of Ceylon Cacao is greatly due to the more careful and effective methods adopted for fermenting and curing the beans. The produce is said to be sent into the market in a bright and attractive condition and free from the dirt and mucilage which too often spoils the appearance of West Indian Cacao. Again, the “soil and climatic conditions” in Ceylon are said to favour the production of Cacao with a delicate flavour and good colour. There is, doubtless, some amount of truth underlying all these opinions, but none of them touch upon an important element in the inquiry, and that is the character of the plants yielding the produce.

The cultivated forms of *Theobroma Cacao* are broadly divided into two sorts, known in Spanish speaking countries of America as Cacao Criollo and Cacao Forastero. At one time Cacao Criollo was largely, if not exclusively, cultivated in Trinidad, but owing to a disease (described as a “blast”) which visited the plantations sometime during the last century this sort was discarded in favour of a more robust and hardy sort, to which the name of Forastero (or foreign) Cacao was given. The Criollo Cacao is said to yield the Caracas Cacao of Venezuela, but it is now comparatively rare in Trinidad and Grenada, and only sparsely found in the other West India Islands. The Cacao first introduced into Ceylon and the East Indies, probably by the Dutch in the beginning of the century, was the Criollo sort, and if the bulk of the Ceylon produce now received in this country is derived from Criollo trees that would in a great measure account for its superior quality. A Trinidad planter writes: “The Criollo Cacao is much better flavoured than any other, “ and requires but three days’ fermentation.” This aspect of the case has already been dealt with by Dr. Trimen, F.R.S., Director of the Botanical Gardens, Ceylon, in his Annual Report for the year 1885:—

“There has been some demand during the year for seed of the Trinidad varieties at Peradeniya, and the belief is general that these large growing kinds are hardier than the old Ceylon sort. Since the date of my last report I have arrived at the conclusion that the various ‘pale-fruited’ kinds (see Report for 1882) sparingly cultivated in Ceylon, as well as all the strains of these new Trinidad plants, are to be referred to the ‘Forastero’ class of Cacao. All of them, whatever the colour of the pods—purple, dark-red, pink, yellow, or pale-green—have seeds (‘beans’), which are flattish in form, and purple or violet internally, and become very dark after curing. Our old Cacao, on the contrary, has the pod nearly always red (occasionally bright yellow), and the seeds are more rounded in shape, and always white or yellowish on section when fresh, becoming red after preparation for the market. As to the proper name of this latter sort, I may quote a portion of a letter which I addressed to the *Observer* newspaper, in November last, upon the subject:—

““The fruiting of the selected and named varieties sent from Trinidad in 1880 and 1881 has since shown that all these names (Cundeamor,

\* In 1885 the actual production was 122,585 cwts.



Cayenne, Verdilico, &c.) are applied to forms of what is known there as 'Forastero' Cacao, and that none of the purple seeded kinds are of the 'Criollo' or 'Caracas' variety. It will therefore be well to use for the future the name 'Forastero' for them here also.

"This being the case, the question naturally arises as to the ordinary red Cacao of Ceylon. What variety is it; and is there anything like it grown elsewhere? For some time I have been becoming more convinced that it is *this* that is the 'Caracas' or 'Criollo' Cacao, and I might have taken stronger ground on the matter than I did in my last report. Mr. Morris of Jamaica, who has had good opportunity of investigating the Cacaos, both in a wild and cultivated state, tells me that he knows of 'only one kind with the cotyledons white or whitish, and that is what is known as Caracas Cacao.' This, it is well known, is now a rare kind in the West Indies, and scarcely to be found on Trinidad estates, having died out, though formerly largely grown there. Evidently Ceylon obtained its plants before this change had occurred. The high quality of 'Ceylon Cacao' is thus explained, as well as its delicate temperament."

It only remains to point out that the preparation of Ceylon Cacao differs in one important point from that generally adopted in Trinidad and other parts of tropical America. In Ceylon, after the beans are fermented the pulp is carefully removed by washing, and the result is the production of a clean, bright looking sample, free from mucilage and discolouration of any kind. In the West Indies, after fermentation, the beans are generally neither washed nor thoroughly rubbed. The mucilage is allowed to dry upon them. On some of the best estates in Trinidad the mucilage is carefully removed by rubbing, and sometimes a red absorbent earth is used to assist the process as well as to give an attractive colour to the beans. The various methods adopted for fermenting and curing Cacao in the West Indies are well given in a series of Essays published in the *Agricultural Record* (the Journal of the Central Agricultural Board of Trinidad) for March 1890. The present position of Ceylon Cacao in the London Market is discussed in the following letter, for which we are indebted to the courtesy of Messrs. Shand, Haldane, & Co., of 24, Rood Lane, E.C. :—

MESSRS. LEWIS AND NOYES to MESSRS. SHAND, HALDANE, & CO.

14, Mincing Lane, E.C.,  
July 2, 1890.

DEAR SIRS,

THE following remarks may give some explanation of the peculiar position held by Ceylon cacao as compared with Trinidad.

The consumptive demand during recent years has caused manufacturers generally to give their attention to the making of a cocoa and a chocolate for which Ceylon is especially adapted on account of its bright chocolate-coloured break and mild flavour in preference to the strong flavoured Trinidad sought after a few years ago.

The lightness and easy fracture of the shell through the removal of mucilage renders the loss in weight less to manufacturers and likewise facilitates the working.

To the demand exceeding the supply (the largest output from Ceylon in one year being less than 20,000 cwt.), together with the fact that the crop is shipped almost entirely to this port, thus creating keen competition from the markets of all other manufacturing countries, may be attributed the existing high prices.







"The cakes were found to contain only 6·7 per cent of proteids, with 3·4 per cent. of ash. The large amount of dextrin is due to the high temperature to which the chestnuts are subjected in the process of drying. Professor Church thinks that chestnut flour ought to be of easy digestibility, and a suitable children's food, considering that it contains over 40 per cent. of nutritious matters soluble in pure water."

### CLIX.—WINE PRODUCTION IN FRANCE.

The following note respecting the wine production of France was recently published in "*Annales de la Société d'Horticulture et d'Histoire naturelle de l'Herault*," 1889, p. 252. The figures themselves are taken from the *Bulletin de Statistique du Ministère des finances* :—

Années.		Nombre d'hectares plantés en vigne.	Production en hectolitres de vin récolté.
1880	-	2,204,459	29,667,000
1881	-	2,699,923	34,139,000
1882	-	2,135,349	30,886,000
1883	-	2,095,927	36,029,000
1884	-	2,040,759	34,781,000
1885	-	1,990,586	28,536,000
1886	-	1,959,102	25,063,000
1887	-	1,944,150	24,333,660
1888	-	1,843,580	30,102,000
1889	-	1,817,787	23,224,900

### CLX.—RAMIE AS FOOD FOR SILKWORMS.

(*Boehmeria nivea*, H. K.)

The Ramie or Rhea plant (*Boehmeria nivea*) is being experimentally cultivated in numerous parts of the world as a fibre plant. Particulars in regard to the numerous attempts that have been made to prepare the fibre of the Ramie on a commercial scale have already been given in the *Kew Bulletin* (June, November, and December 1888; and November and December 1889). It now appears that the leaves of the Ramie plant may be used as a food for silkworms, in the same way as those of the mulberry and Osage orange (*Maclura aurantiaca*). All three plants belong to the same natural order *Urticaceæ*, and there should be no reason why they should not be found equally suitable. The following account of the use of Ramie leaves for feeding silkworms in the United States was communicated to the Foreign Office by Mr. A. de G. de Fonblanque, H.B.M.'s Consul at New Orleans :—

"A discovery has been made by a lady in Columbia, S. C., that may have a marked effect upon two great industries. For a number of seasons this lady has amused herself by feeding silkworms and sending a few pounds of cocoons to the Women's Society for the Encouragement of the Silk Industry in Philadelphia. The extraordinary warmth of this winter caused the eggs to hatch far in advance of the season, and as the



young leaves of the mulberry and the Osage orange had not put forth, our amateur was at a loss what to do. An account adds :

“ ‘ Seeing that the foliage of the Ramie in a neighbouring field was putting out, she gathered some and put the worms upon it. They fed ravenously, and she kept up the supply until the Osage orange leaves appeared. Then she divided her worms equally, feeding one set with Ramie, the other with Osage orange. She kept the cocoons separate and sent them to Philadelphia. The experts there were astonished at the size of those spun by the Ramie eaters, and wrote to the lady to know what she had done to secure them. They were not only larger, but the silk was finer.’ ”

“ If further experiments should prove that Ramie leaves can be depended upon for silkworms’ food, then a great impetus will be given to the production of this valuable article in the South, while it will add to the profits of those who raise that plant for its fibre.”

# CLXI.—LIST of the STAFFS of the ROYAL GARDENS, Kew, and of Botanical Departments and Establishments at Home, and in India, and the Colonies, in Correspondence with Kew.

\* Trained at Kew.

† Recommended by Kew.

## Royal Gardens, Kew:—

Director	-	-	-	W. T. Thiselton Dyer, C.M.G., F.R.S., F.L.S.
Assistant Director	-	-	-	D. Morris, M.A., F.L.S.
Clerks	-	-	-	John Bliss and F. W. P. French.
Keeper of Herbarium and Library				J. G. Baker, F.R.S., F.L.S.
Principal Assistant	-	-	-	W. B. Hemsley, F.R.S., A.L.S.
Mycologist	-	-	-	Dr. M. C. Cooke, M.A., A.L.S.
Assistant for India	-	-	-	—
Assistant	-	-	-	N. E. Brown, A.L.S.
”	-	-	-	R. A. Rolfe, A.L.S.
”	-	-	-	C. H. Wright.
Attendant	-	-	-	J. T. Jeffrey.
Curator of Museums	-	-	-	John R. Jackson, A.L.S.
Office Assistant	-	-	-	J. M. Hillier.
Préparateur	-	-	-	George Badderly.
Curator of the Gardens	-	-	-	George Nicholson, A.L.S.
Assistant Curator	-	-	-	William Watson.

## Foremen:—

Arboretum	-	-	-	William Truelove.
Herbaceous Department	-	-	-	Daniel Dewar.
Greenhouse and Ornamental Department.				Frank Garrett.
Temperate House (Sub-tropical Department).				William J. Bean.

**Antigua.**—Botanical Station :—

Curator - - \*Arthur J. Tillson.

**Bangalore.**—Government Botanic Gardens, Lal Bagh :—

Superintendent - \*John Cameron, F.L.S.

**Barbados.**—Dod's Reformatory, Botanical Station :—

Superintendent - John R. Bovell.

**Bombay.**—Horticultural Gardens and Parks :—

Oodeypore - - Superintendent - \*T. H. Storey.

Poona (Ghorpuri) Lecturer on Botany, } \*G. Marshall Woodrow.  
 College of Science. }  
 Superintendent - W. Shearer.

**Bombay.**—Municipal Garden :—

Superintendent - G. H. Carstensen.

**British Guiana.**—Botanical Gardens :—Georgetown - Superintendent and \*George S. Jenman, F.L.S.  
 Government Botan-  
 ist.

Head Gardener - John F. Waby.

Second „ - \*Robert Ward.

Berbice - Keeper - Richard Hunt.

**Calcutta.**—Department of Royal Botanic Gardens :—Superintendent - Dr. George King, C.I.E.,  
 LL.D., F.R.S., F.L.S.Seebpore - Curator of Herbarium Dr. David Prain, F.L.S.,  
 F.R.S.E.

„ Garden - \*William McHardy.

Assistant - - \*Robert L. Proudlock.

Mungpoo - Superintendent, Dr. George King, C.I.E.,  
 Government Cin- LL.D., F.R.S., F.L.S.  
 chona Plantations.

Resident Manager - \*J. A. Gammie.

1st Assistant - \*R. Pantling.

2nd „ - - \*Joseph Parkes.

3rd „ - - G. Gammie.

4th „ - - \*Amos Hartless.

Darjeeling - Curator, Lloyd Bo- \*William A. Kennedy.  
 tanic Garden.**Cambridge.**—University Botanic Gardens :—Professor - - Charles C. Babington,  
 F.R.S., F.L.S.Secretary to Botanic Dr. Francis Darwin,  
 Garden Syndicate. F.R.S., F.L.S.Curator - - \*Richard Irwin Lynch,  
 A.L.S.**Canada:**—Ottawa - - Dominion Botanist - Prof. John Macoun,  
 F.R.S.C., F.L.S.Director of Govern- Prof. Wm. Saunders,  
 ment Experimental F.R.S.C., F.L.S.  
 Farms.Montreal - Director, Botanic Prof. Penhallow, B.Sc.  
 Garden.



**Cape Colony.**—Gardens and Public Parks :—

Cape Town	Director	-	Prof. MacOwan, F.L.S.
	Head Gardener	-	H. J. Chalwin.
Grahamstown	Curator	-	Edwin Tidmarsh.
Port Elizabeth (St. George's Park) :—			
	Superintendent	-	John T. Butters.
King Williamstown	Curator	-	*T. R. Sim.
Graaf Reinet	„	-	J. C. Smith.
Uitenhage	„	-	H. Fairey.

**Ceylon.**—Department of Royal Botanical Gardens :—

	Director	-	†Dr. Henry Trimen, F.R.S., F.L.S.
Peradeniya	Head Gardener	-	*Peter D. G. Clarke.
	Clerk and Foreman	-	J. A. Ferdinandus.
	Draughtsman	-	W. de Alwis.
Hakgala	Superintendent	-	*William Nock.
	Clerk and Foreman	-	H. M. Alwis.
Henaratgoda	Conductor	-	A. de Zoysa, Muhan- diram.
Anuràdhapura	„	-	T. de Silva, Arachchi.
Badulla	„	-	D. Guneratne.

**Dominica.**—Botanical Station :—

Curator	-	-
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**Dublin.**—Royal Botanic Gardens, Glasnevin :—

Curator	-	Frederick W. Moore, Cor. Mem. R.H.S.
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## Trinity College Botanic Gardens :—

Professor	-	Dr. E. Perceval Wright, F.L.S., Sec. R.I.A.
Curator	-	*F. W. Burbidge, M.A., F.L.S.

**Edinburgh.**—Royal Botanic Gardens :—

Regius Keeper	-	Dr. Isaac Bayley Balfour, F.R.S., F.L.S.
Curator	-	Robert Lindsay, F.R.H.S.

**Fiji.**—Botanical Station :—

Curator	-	*Daniel Yeoward.
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**Gambia.**—Botanical Station :—

Administrator	-	Hon. Gilbert T. Carter, C.M.G.
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**Glasgow.**—Royal Botanic Institution :—

University Professor	-	Dr. F. O. Bower, F.L.S.
Curator	-	*Robert Bullen, Cor. Mem. R.H.S.



**Gold Coast.**—Botanical Station :—

Curator - - \*William Crowther.

**Grenada.**—Botanical Garden :—

Curator - - †Charles M. Murray.

**Hong Kong.**—Botanical and Afforestation Department :—

Superintendent - †Charles Ford, F.L.S.

Assistant Superintendent. \*Alexander B. Westland.

**Jamaica.**—Department of Public Gardens and Plantations :—Director - - †William Fawcett, B.Sc.,  
F.L.S.

Hope Gardens - Superintendent - \*William Harris.

Castleton Garden - „ - \*William J. Thompson.

Cinchona (Hill) „ - \*William Cradwick.  
Garden.Kingston Parade „ - John Campbell.  
Garden.King's House „ - Eugene Campbell.  
Garden.

Bath - - Overseer - - W. Groves.

**Lagos.**—Botanical Station :—

Curator - - †James McNair.

**Madras.**—Botanical Department :—Ootacamund - Government Botanist †M. A. Lawson, M.A.,  
and Director of the F.L.S.  
Government Cin-  
chona Plantations.

Curator - - \*Andrew Jamieson.

**Madras.**—Agri Horticultural Society :—

Secretary - - Edgar Thurston.

Superintendent - \*J. M. Gleeson.

**Malta.**—Botanical Garden :—

Director - -

**Mauritius.**—Department of Forests and Botanical Gardens :—

Pamplemousses - Director - - \*John Horne, F.L.S.

Assistant - - \*William Scott.

Curepipe - - Overseer - - —

**Natal.**—Botanical Gardens :—Durban - - Curator - - John Medley Wood,  
A.L.S.

Pietermaritzburg „ - - G. Mitchell.

**New South Wales.**—Botanical Gardens :—

Sydney - - Director - - Charles Moore, F.L.S.

**New Zealand:—****Wellington.—Colonial Botanic Garden:—**

	Director	-	-	Sir James Hector, K.C.M.G., F.R.S.
	Head Gardener	-	-	William Bramley.
Dunedin -	Superintendent	-	-	Adam Gibson.
Napier -	"	-	-	W. W. Bower.
Invercargill	Head Gardener	-	-	Thomas Wangle.
Auckland	Ranger	-	-	William Goldie.

**Northern India.—Botanical Department:—**

Saharunpur	Director	-	-	†J. F. Duthie, B.A., F.L.S.
	Superintendent of Garden.			William Gollan.
Lucknow	Superintendent	-	-	*M. Ridley.
Cawnpore	Assistant Director in charge of Experimental Station.			Sayyed Mahammad Husain.

**Oxford.—University Botanic Garden:**

Professor	-	-	Dr. Sydney H. Vines, F.R.S., F.L.S.
Curator	-	-	*William Baker, F.R.H.S.

**Queensland.—Botanical Gardens:—**

Brisbane -	Colonial Botanist	-	F. M. Bailey, F.L.S.
	Head Gardener	-	*Philip MacMahon.
	Overseer	-	J. Cameron.
Acclimatization Society's Gardens	} Secretary and Manager Wm. Soutter.		
Rockhampton	Superintendent	-	J. S. Edgar.

**St. Kitts-Nevis.—Botanical Station:—**

Curator	-	-	*Charles Plumb.
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**St. Lucia.—Botanical Station:—**

Curator	-	-	†John Gray.
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**St. Vincent.—Botanical Station:—**

Curator	-	-	*Henry Powell.
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**South Australia.—Botanical Gardens:—**

Adelaide	Director	-	-	Dr. Schomburgk, Ph.D.
Port Darwin	Curator	-	-	Maurice Holtze, F.L.S.

**Straits Settlements.—Gardens and Forest Department:—**

Singapore	Director	-	-	†H. N. Ridley, M.A., F.L.S.
	Head Gardener	-	-	*Walter Fox.
Penang -	Assistant Superintendent.			†Charles Curtis.
Malacca -	"			*Robert Derry.



**Tasmania.**—Botanical Gardens:—  
Hobart Town - Superintendent

- F. Abbott.

**Trinidad.**—Royal Botanical Gardens:—

Superintendent

- †John H. Hart, F.L.S.

Assistant

-

- \*Walter E. Broadway.

**Victoria:**—

Melbourne

- Government Botanist

Sir F. von Mueller, F.R.S.,  
K.C.M.G.

Botanical Gardens:—

Director

-

- W. R. Guilfoyle, F.L.S.